



TechNet

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SCF-050 Service Manual Addendum

This addendum covers the SCF-050 Multi-Fuel Add-On Furnace heating system. Please read through Section B of the St Croix Service Manual that covers the Multi-Fuel Burn System. The design of this furnace is based on the Freestanding St Croix stoves.

The Electrical Components of this furnace are the same as those shown in section B with the following exceptions:

- 1 - This furnace has a different control board.
- 2 - The Furnace has a 600-800 CFM Convection Blower
- 3 - The Furnace has a Fan/Limit Control, which has a dual function. It controls the Room Air Blower and also acts as the High Limit Switch to shut the unit down if temperatures rise above 200 Degrees F. in the Plenum area.

Control Board Features

The Control Board functions slightly differently that the freestanding stove versions. Please read the following description of the Control Board.

- a. General Operation of the Furnace.
- b. Safety Features, to shut the unit down in the event the sensors detect a problem in the unit.

The Control Board also has Diagnostic Capabilities to help in diagnosing 3 areas in the furnace. These areas are:

1. High Temperature Limit.
2. Proof of Fire Sensor
3. Vacuum in the Firebox

A closer look at the Control Board to the right in figure 1 will explain how the board works. There are five buttons labeled 1 through 5, a slide switch labeled 6 and a LED Light bar with 5 Heat Settings. *The LED Light bar is also used during the Diagnostic process, see page 80 for more details on Diagnostic Features.*

The buttons on the board function as follows: (Refer to Figure 1. The touch pad buttons are labeled with the white numbers 1 through 5)

1. The Heat Level button (1) will advance the setting between level 1 and 5. Once you reach level 5, it will drop back to level 1. Each level has a LED light to indicate where the board is set.

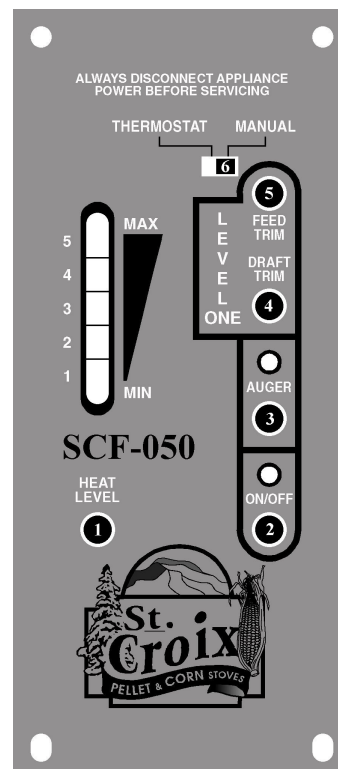


Figure 1

2. The On/Off button (2) turns the Furnace On and Off. It will also reset the board after the board has sensed a problem and is flashing a Diagnostic code.
3. The Auger button (3) will allow the customer to manually auger fuel into the burn pot on start up when needed. This is particularly helpful in priming the Auger Tube when it is empty.
4. The Draft Trim button (4) allows for adjusting the Exhaust fan voltage on Heat Level 1 only. Push the button and the all of the LED Lights in the light bar will flash once (See figure 5). This decreases the voltage approximately 5 volts below the default setting. Push the button a second time and all of the LED Lights in the light bar will flash twice. (See figure 5) This increases the voltage approximately 5 volts above the default setting. Pushing the button a 3rd time will reset the voltage to the default setting. This adjustment is available to fine tune the #1 Heat Level draft setting. This would only be used in the case the furnace was hooked up to a tall Vertical Chimney (to decrease the draft if needed) or if it was connected to a Chimney with a long Horizontal run (to increase the draft if needed).
5. The Feed Trim button (5) will allow the Fuel feed rate to be adjusted on Heat Level 1 only. Heat Level 1 should be seen as the Pilot setting of the furnace, when operating on a Thermostat. Pushing the Feed Trim button (5) will switch between the different adjustments. Heat Level one can be adjusted in the following ways:
 - a. The first LED only indicates the Normal #1 setting. (2.5 second on time). This is the highest Pilot setting and may be used when heating a larger size home. (See figure 2)
 - b. The first and fourth LED lights indicate the #1 **Low** setting. (2.0 second on time) This is the medium Pilot setting and may be used when heating a medium size home where less heat is needed when the unit is running in pilot mode. (See figure 3)
 - c. The first and fifth LED lights indicate the #1 **High** setting. (1.50 second on time) This is the lowest Pilot setting and may be used when heating a small size home where minimal heat is needed when the unit is running in pilot mode. (See figure 4)

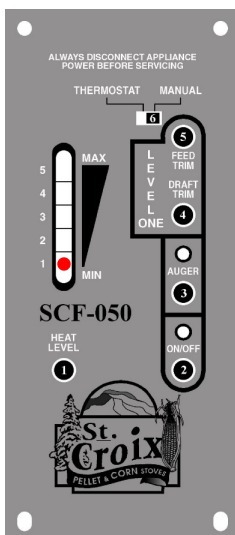


Figure 2

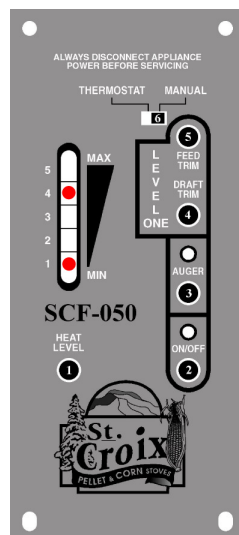


Figure 3

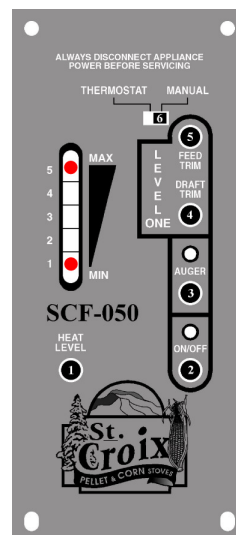


Figure 4

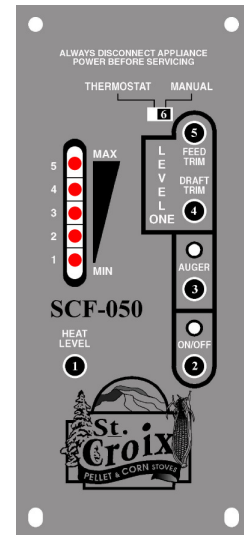


Figure 5

The adjustments described in points 4 and 5 remain in effect as long as the unit is plugged in. If the unit gets unplugged or if there is a power failure the settings are lost and the adjustments would need to be reset.

Troubleshooting Flow Charts for the SCF-050

The Trouble shooting **Flow Charts** for the following components will be referenced from Section B of this Service Manual to eliminate duplicating the charts:

Digital Control Board

Please refer to page 100 of the original Digital Control Board Service Manual.

Combustion Blower

Please refer to page 103 of the original Digital Control Board Service Manual.

Vacuum Switch

Please refer to page 103 of the original Digital Control Board Service Manual.

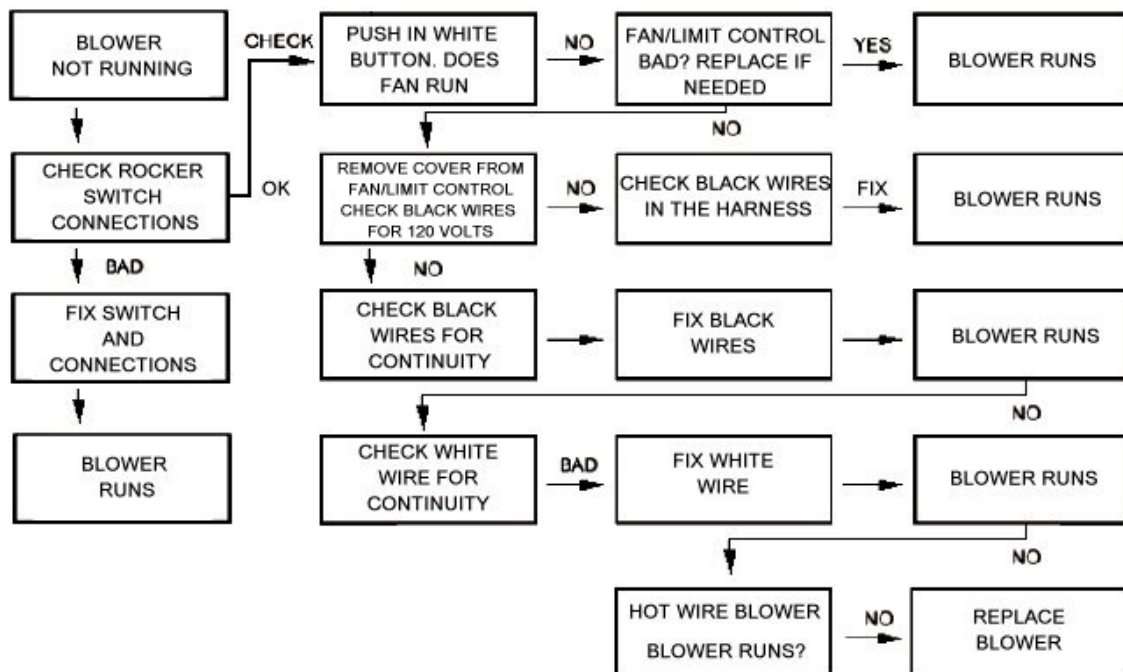
Proof of Fire Switch

Please refer to page 106 of the original Digital Control Board Service Manual.

Troubleshooting Flow Charts

Convection Blower

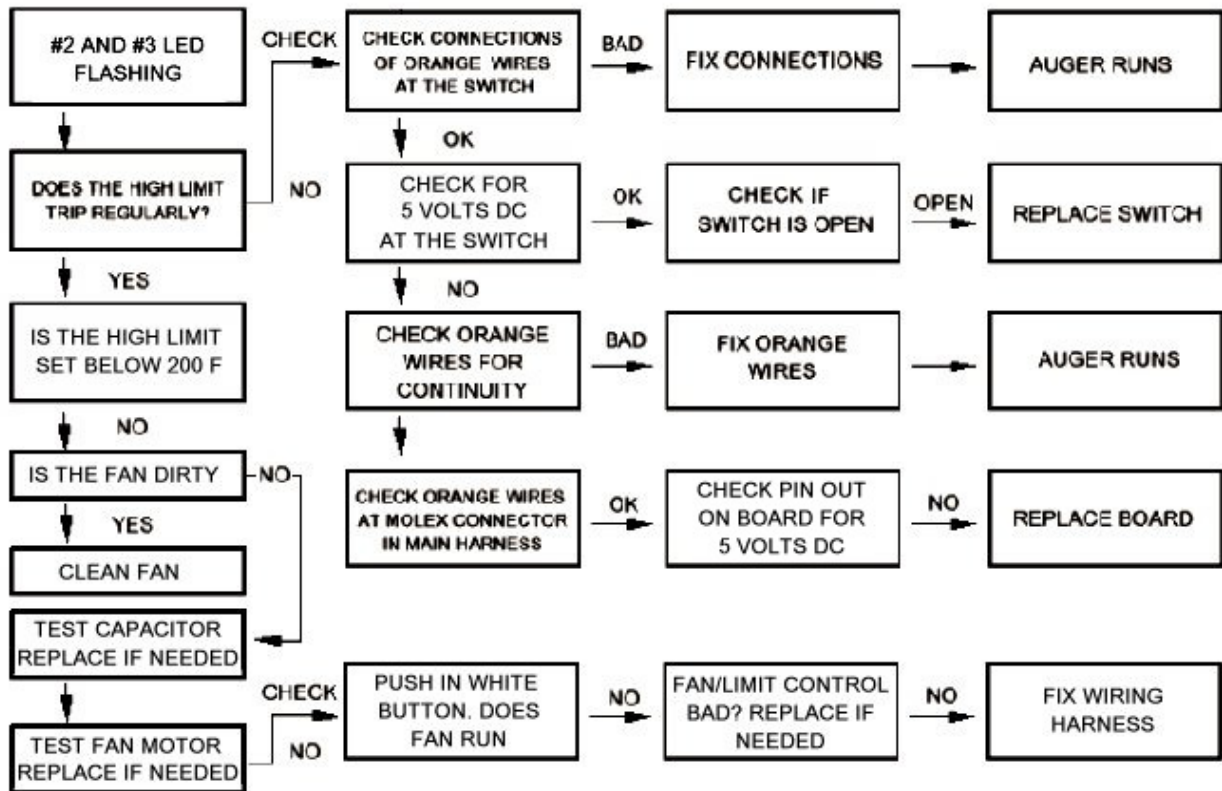
The Convection Blower in the SCF-050 is a 2-speed Blower. The Low speed is 600 CFM and the High speed is 800 CFM. The Blower runs with the aid of a Capacitor. The Fan/Limit Control controls the Blower. The Fan/Limit Control has adjustable settings to operate the blower at different temperature settings.



NOTE: A Blower problem can sometimes be traced back to loose wiring connections at the Capacitor. Check the brown wires that are connected to the Capacitor for loose connections. Use caution when handling Capacitors.

Fan/Limit Control

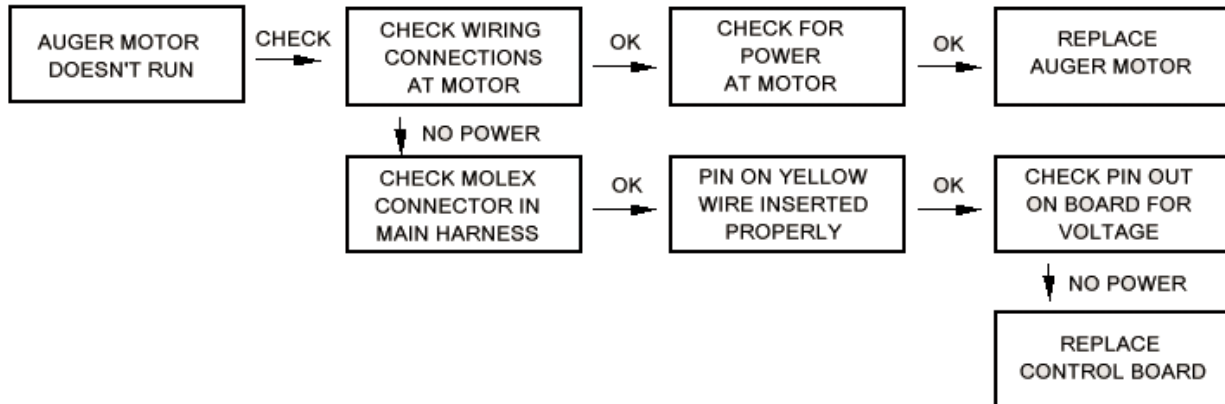
The Fan/Limit Control shuts the furnace down in an Over-Temp situation. This usually involves the room air fan. The fan may be defective or the fan may need cleaning. If the squirrel cage becomes dirty, they can't move enough air to keep the furnace cool enough when running on the higher settings. If the High Limit trips more than once a closer look should be given to Convection Blower of the furnace. The Fan/Limit Control may actually be causing the problem if it is not controlling the fan correctly. The control is adjustable and the settings should be looked at when troubleshooting this area. Setting the Limit setting too low could cause the unit to shut down at the incorrect temperature.



NOTE: The Room Air Fan (Convection Blower) is wired independently from the Control Board. Keep in mind when troubleshooting this area of the furnace that replacing the Control Board will not fix any issues related to the Blower and Fan/Limit Control.

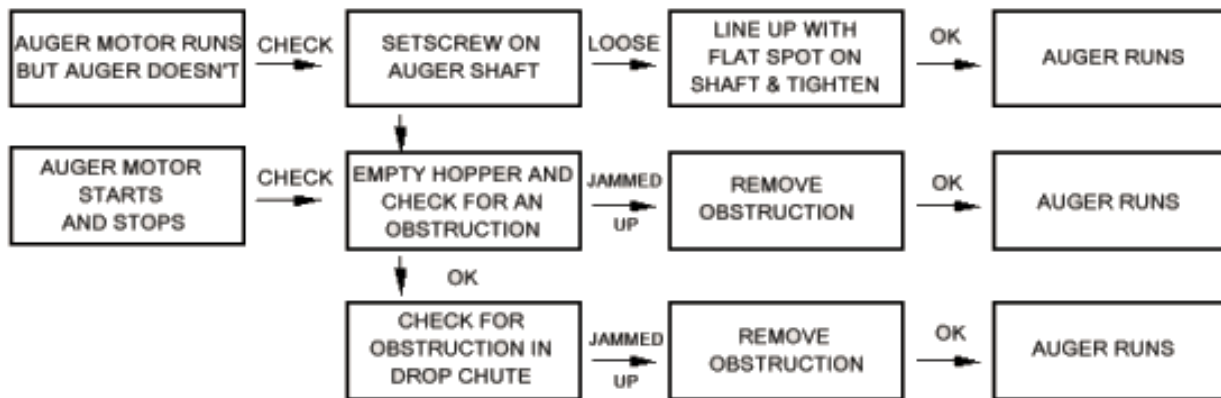
NOTE: A dirty Filter may cause the furnace to run hotter and may contribute to the unit shutting down. Check the filter and replace if needed.

Auger Motor - Electrical



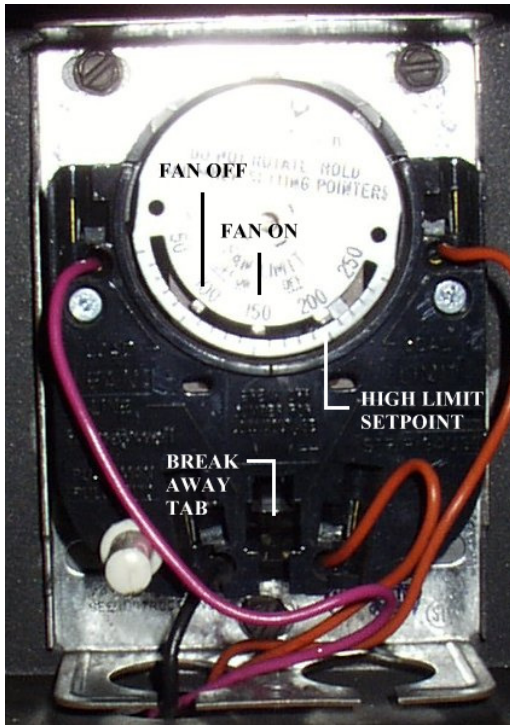
Remember: Checking for Voltage either at the Harness or directly at the Pin-Out of the control board can only be done when the Auger should be running. The auger runs for 2 minutes during the Start-Up Cycle or runs at a #1 level 5 minutes after the stove is first turned on. Hot-wiring the fan direct with a power cord is also a good way to check the Auger motor.

Auger Motor - Mechanical



Notice there are 2 areas to look for an obstruction if the auger is jammed. Many times the Drop-Chute is ignored. This may be where the jam originates, and cleaning the auger tube *only* is half of the job.

Fan/Limit Control - Replacement



Before installing the new Fan/Limit Control, be sure to remove the Break-Away tab between the left and right wiring circuits. See figure 6 to the left. After replacing the Fan/Limit Control, remember to adjust the Fan ON and the Fan OFF settings. Failure to adjust these settings may cause the Blower to short cycle.

Figure 6

Feed Rate Adjustment

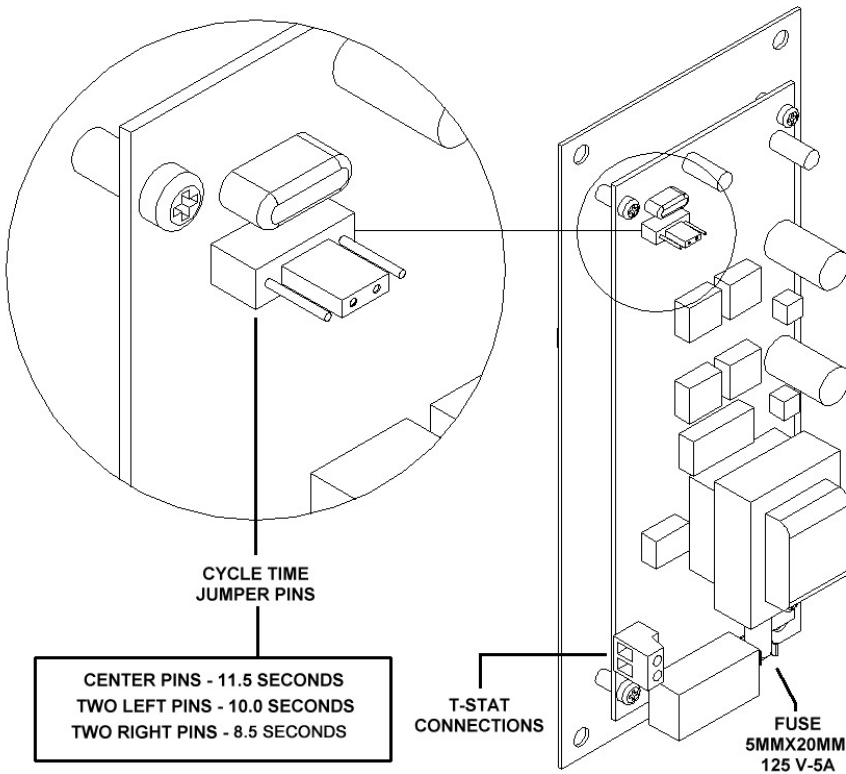


Figure 7

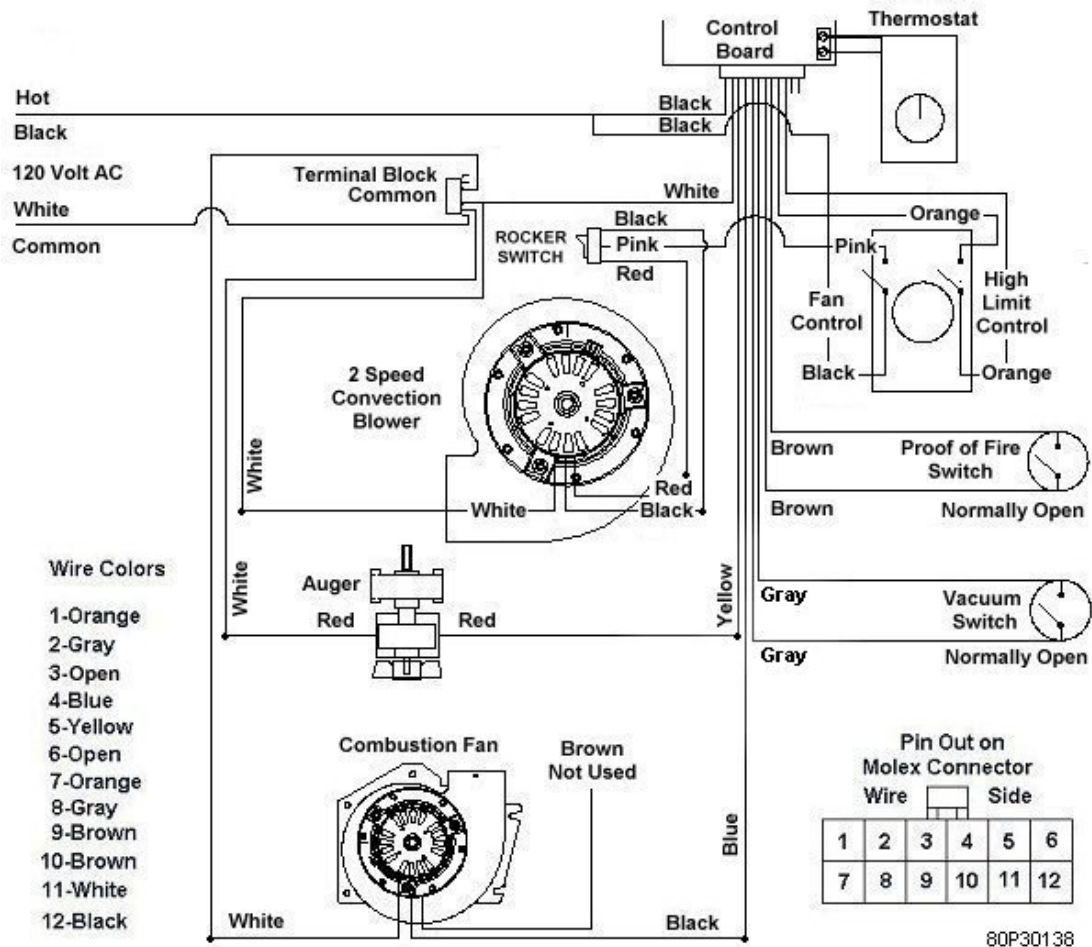
The Default Cycle Time is 10.0 seconds. Please see figure 7 to the left.

The 10.0-second cycle can be changed to 8.5 seconds by placing the jumper on the 2 pins to the Right. This should only be done if the fuel used feeds slowly, such as long Pellets or Cherry Pits.

Use Caution when switching to a shorter Cycle Time. If the pot overloads using a shorter Cycle Time, set the board back to a Longer Cycle Time.

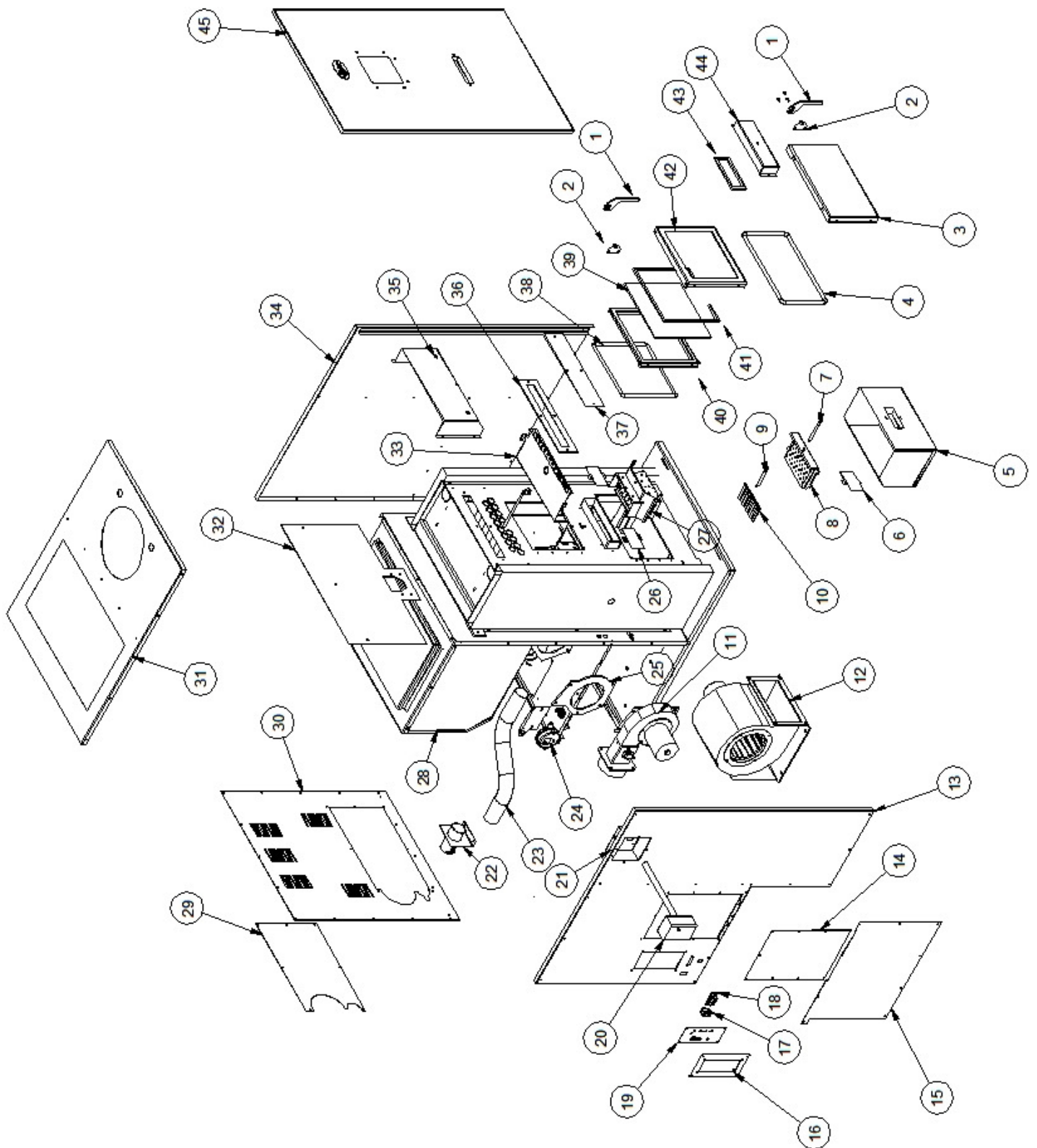
Certain fuels (Mainly Corn and Small Grains) tend to feed faster and may need to be slowed down. Placing the jumper on the 2 Center Pins will change the Cycle Time to 11.5 seconds.

SCF-050 Wiring Schematic

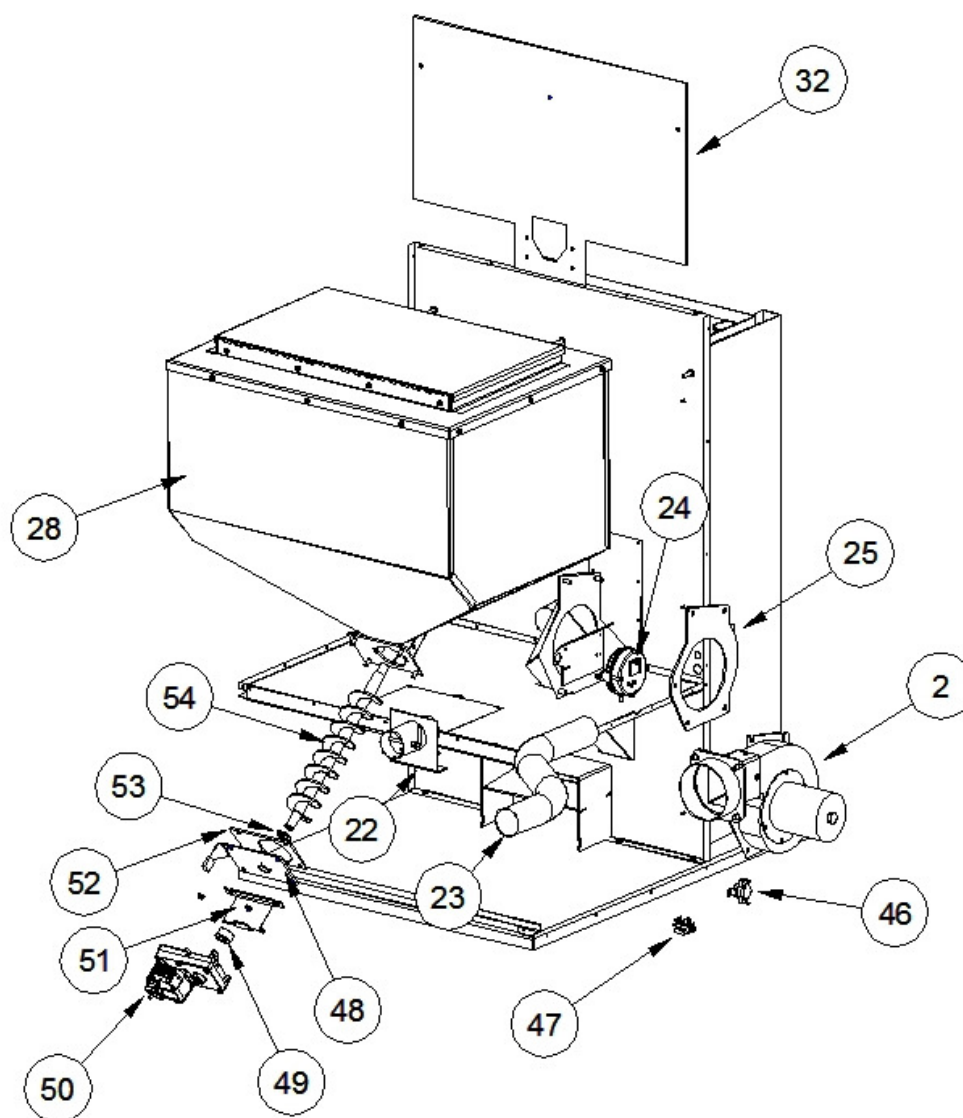


The Electrical Rating of this furnace is: 120 Volt, 60 Hz, 4 AMP. The minimum recommended circuit is 15 Amp. A dedicated circuit for the furnace is recommended.

SCF-050 Parts Lay-out



#	PART NUMBER	DESCRIPTION
1	80P53707-R	DOOR HANDLE
2	80P53677-R	MOUNT PLATE ASSEMBLY
3	80P53797-R	ASH PAN DOOR - COMPLETE
4	80P20132-R	ASH PAN DOOR GASKET – 42”
5	80P53798-R	ASHPAN
6	80P30162-R	ASH PAN AREA CLEANOUT COVER
7	80P52592-R	SLIDER ROD - UNIVERSAL
8	80P53623-R	POT SLIDER ASSEMBLY
9	80P52568-R	COAL RAKE ROD
10	80P53619-R	COAL RAKE
11	80P2001-R	COMBUSTION FAN
12	80P30144-R	CONVECTION BLOWER
13	80P30089-R	CABINET SIDE LEFT
14	80P30102-R	EXHAUST FAN ACCESS PANEL
15	80P30085-R	BLOWER ACCESS PANEL
16	80P53835-R	CONTROL COVER ASSEMBLY
17	80P30207-R	ROCKER SWITCH – 2 SPEED BLOWER
18	80P30045-R	SPEAKER TERMINAL - THERMOSTAT
19	80P30205-R	CONTROL BOARD – SCF-050
20	80P30147-R	FAN/LIMIT CONTROL
21	80P30169-R	FAN LIMIT MOUNT BOX
22	80P53813-R	INTAKE DAMPER WELDMENT
23	54995K24-R	2” ALUMINUM HOSE – 22”
24	80P30658-R	VACUUM SWITCH
25	80P20168-R	COMBUSTION FAN GASKET
26	80P52237-R	CLEAN OUT COVER PLATE - FIREBOX
27	80P53836 -R	BURN POT WELDMENT
28	80P53810-R	HOPPER - COMPLETE
29	80P30168-R	AUGER ACCESS PLATE
30	80P53843-R	BACK PANEL/FILTER BRACKET ASSEMBLY
31	80P30092-R	CABINET TOP
32	80P30151-R	HOPPER MOUNT GASKET
33	80P30206-R	HEAT EXCHANGE BAFFLE
34	80P30090-R	CABINET SIDE - RIGHT
35	80P30094-R	HOT AIR BOX
36	80P30142-R	WATERCOIL ACCESS COVER GASKET
37	80P30119-R	WATERCOIL ACCESS COVER
38	80P20132-R	DOOR GASKET – 40”
39	80P30143-R	DOOR GLASS
40	80P30130-R	GLASS RETAINER
41	80P20022-R	GLASS GASKET – 35”
42	80P30125-R	DOOR FRAME - FIREBOX
43	80P20027-R	SLIDE OUT BOTTOM COVER GASKET – 24”
44	80P30139-R	SLIDE OUT BOTTOM COVER
45	80P53795-R	CABINET FRONT DOOR ASSEMBLY



#	PART NUMBER	DESCRIPTION
46	80P20038-R	PROOF OF FIRE SWITCH
47	80P52630-R	TERMINAL BLOCK
48	80P52957-R	MOTOR MOUNT BRACKET ASSEMBLY
49	80P20248-R	5/8" COLLAR W/ SETSCREW
50	80P20278-R	AUGER MOTOR
51	80P30191-R	MOTOR RETAINER BRACKET
52	80P20245-R	AUGER GASKET
53	80P50858-R	AUGER BUSHING WASHER
54	80P53807-R	AUGER WELDMENT

SCF-050 Data Table

**Based on a default Cycle Time of 10.0 seconds.
Cycle time equals the ON time & OFF Time combined.**

Heat Level Selection	Auger ON (Seconds)	Combustion Fan Voltage +/- 10%	Convection Fan Voltage +/- 10%	Corn Fuel (Lbs./Hour) +/- 10%
Start-Up Cycle	Off for the first 5 minutes	100 Volts	OFF	NA
1	2.5	90 Volts	120 Volts	2.0 Lbs.
2	3.0	98 Volts	120 Volts	2.75 Lbs.
3	3.5	105 volts	120 Volts	3.5 Lbs
4	4.0	111 volts	120 Volts	4.35 Lbs.
5	4.5	120 volts	120 Volts	5.20 Lbs.

The SCF-050 is approved for Corn, Wheat, Rye, Cherry Pits, Distiller's Grain Pellets and Wood Pellets. Feed rates will vary from fuel to fuel. The above chart is in reference to burning corn.